

WHAT IS CLAIMED IS:

1. An electron source forming substrate provided  
with an insulating material layer on a surface of a  
substrate, at which surface an electron emitting device  
5 is disposed, wherein the insulating material layer has  
a plurality of partially exposed metal oxide particles  
on its surface.

2. An electron source forming substrate provided  
10 with an insulating material layer on a surface of a  
substrate, at which surface an electron emitting device  
is disposed, wherein the insulating material layer has  
a plurality of partially exposed metal oxide particles  
on its surface and a plurality of enclosed metal oxide  
15 particles.

3. An electron source forming substrate according  
to Claim 2, wherein the plurality of enclosed metal  
oxide particles form a metal oxide particle layer in  
20 the insulating material layer between the substrate  
surface and the surface of the insulating material  
layer.

4. An electron source forming substrate according  
25 to Claim 2, wherein the plurality of enclosed metal  
oxide particles and the plurality of partially exposed  
metal oxide particles form a metal oxide particle layer

in the insulating material layer between the substrate surface and the surface of the insulating material layer.

5           5. An electron source forming substrate according to one of Claims 2 through 4, wherein the average particle size of the plurality of metal oxide particles partially exposed on the surface of the insulating material layer is larger than the average particle size  
10 of the plurality of metal oxide particles enclosed in the insulating material layer.

          6. An electron source forming substrate according to one of Claims 2 through 4, wherein the average  
15 particle size of the plurality of metal oxide particles partially exposed on the surface of the insulating material layer is in the range of 50 nm to 70 nm, and wherein the average particle size of the plurality of metal oxide particles enclosed in the insulating  
20 material layer is in the range of 6 nm to 40 nm.

          7. An electron source forming substrate according to one of Claims 2 through 4, wherein the average particle size of the plurality of metal oxide particles partially exposed on the surface of the insulating  
25 material layer is 60 nm, and wherein the average particle size of the plurality of metal oxide particles

enclosed in the insulating material layer is in the range of 6 nm to 40 nm.

8. An electron source forming substrate according to one of Claims 1 and 2, wherein the substrate is one containing sodium.

9. An electron source forming substrate according to Claim 8, wherein the insulating material layer is a sodium blocking layer.

10. An electron source forming substrate according to one of Claims 1 and 2, wherein the insulating material layer is an antistatic layer.

11. An electron source forming substrate provided with an  $\text{SiO}_2$  layer on a surface of a substrate, at which surface an electron-emitting device is disposed, wherein the  $\text{SiO}_2$  layer has a plurality of partially exposed metal oxide particles on the surface.

12. An electron source forming substrate comprising a substrate having an electron-emitting device, and an  $\text{SiO}_2$  layer provided on the surface of the substrate, wherein the  $\text{SiO}_2$  layer has a plurality of partially exposed metal oxide particles on its surface, and a plurality of enclosed metal oxide particles.

13. An electron source forming substrate  
according to Claim 12, wherein the plurality of  
enclosed metal oxide particles form a metal oxide  
particle layer in the SiO<sub>2</sub> layer between the substrate  
5 surface and the surface of the SiO<sub>2</sub> layer.

14. An electron source forming substrate  
according to Claim 12, wherein the plurality of  
enclosed metal oxide particles and the plurality of  
10 partially exposed metal oxide particles form a metal  
oxide particle layer in the SiO<sub>2</sub> layer between the  
substrate surface and the surface of the SiO<sub>2</sub> layer.

15. An electron source forming substrate  
according to one of Claims 12 through 14, wherein the  
average particle size of the plurality of metal oxide  
particles partially exposed on the surface of the SiO<sub>2</sub>  
layer is larger than the average particle size of the  
plurality of metal oxide particles enclosed in the SiO<sub>2</sub>  
20 layer.

16. An electron source forming substrate  
according to one of Claims 12 through 14, wherein the  
average particle size of the plurality of metal oxide  
25 particles partially exposed on the surface of the SiO<sub>2</sub>  
layer is in the range of 50 nm to 70 nm, and wherein  
the average particle size of the plurality of metal

oxide particles enclosed in the SiO<sub>2</sub> layer is in the range of 6 nm to 40 nm.

17. An electron source forming substrate  
5 according to one of Claims 12 through 14, wherein the average particle size of the plurality of metal oxide particles partially exposed on the surface of the SiO<sub>2</sub> layer is 60 nm, and wherein the average particle size of the plurality of metal oxide particles enclosed in  
10 the SiO<sub>2</sub> layer is in the range of 6 nm to 40 nm.

18. An electron source forming substrate  
according to one of Claims 11 and 12, wherein the substrate is one containing sodium.  
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19. An electron source forming substrate  
according to Claim 18, wherein the SiO<sub>2</sub> layer is a sodium blocking layer.

20. An electron source forming substrate  
20 according to one of Claims 11 and 12, wherein the SiO<sub>2</sub> layer is an antistatic layer.

21. An electron source forming substrate  
25 according to one of Claims 1, 2, 11 and 12, wherein the metal oxide particles are electron conductive oxide particles.

22. An electron source forming substrate  
according to one of Claims 1, 2, 11 and 12, wherein the  
metal oxide particles are particles of an oxide of a  
metal selected from the following metals: Fe, Ni, Cu,  
5 Pd, Ir, In, Sn, Sb, and Re.

23. An electron source forming substrate  
according to one of Claims 1, 2, 11 and 12, wherein the  
metal oxide particles are SiO<sub>2</sub> particles.  
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24. An electron source comprising a substrate and  
an electron-emitting device arranged on the substrate,  
wherein the substrate is an electron source forming  
substrate as claimed in one of Claims 1, 2, 11 and 12.  
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25. An electron source according to Claim 24,  
wherein the electron-emitting device is one provided  
with an electroconductive film containing an electron-  
20 emitting region.

26. An electron source according to Claim 24 or  
25, wherein a plurality of electron-emitting devices  
are arranged in a matrix wiring composed of a plurality  
of row-directional wirings and a plurality of column-  
25 directional wirings.

27. An image display apparatus comprising an envelope, an electron-emitting device arranged in the envelope, and an image display member adapted to display images through application of electrons from the electron-emitting device, wherein a substrate on which the electron-emitting device is arranged is an electron source forming substrate as claimed in one of Claims 1, 2, 11 and 12.

28. An image display apparatus according to Claim 27, wherein the electron-emitting device is one provided with an electroconductive film containing an electron-emitting region.

29. An image display apparatus according to Claim 27, wherein a plurality of electron-emitting devices are arranged in a matrix wiring composed of a plurality of row-directional wirings and a plurality of column-directional wirings.